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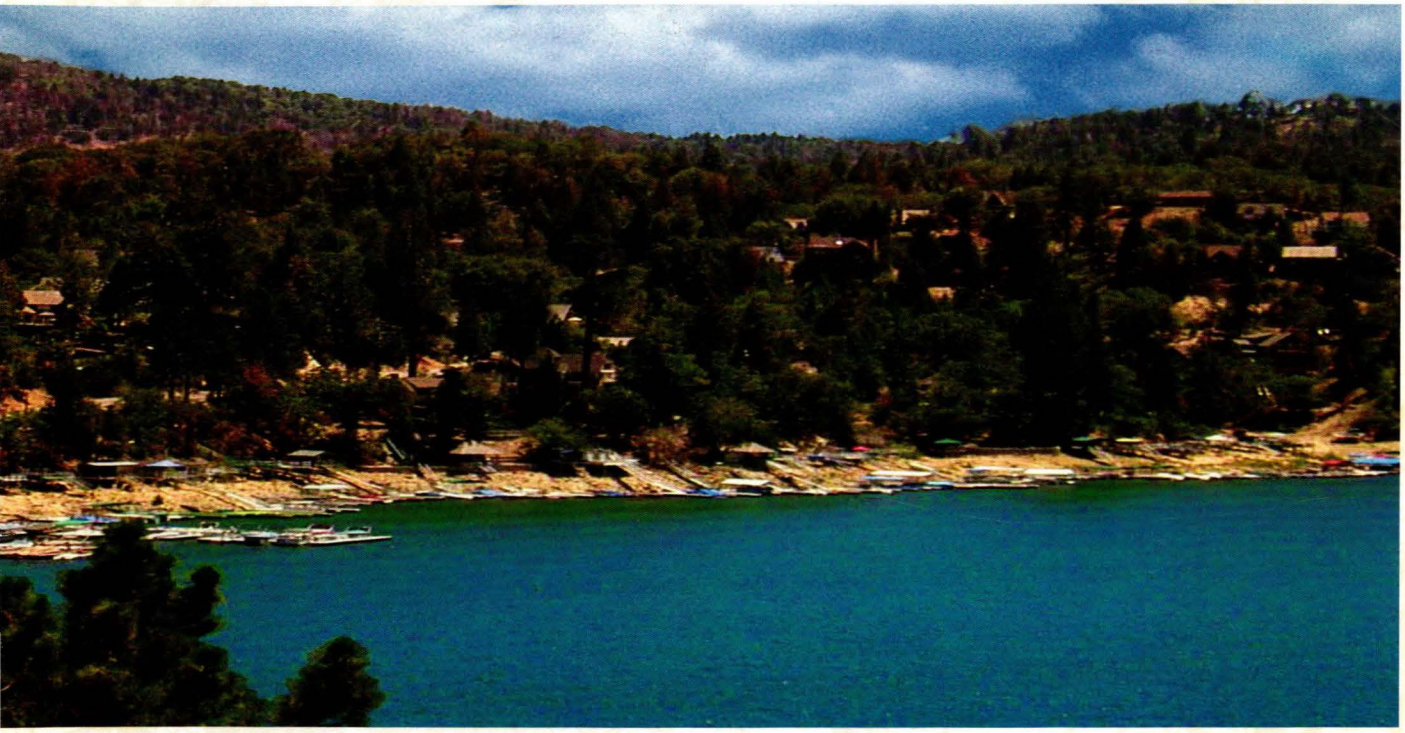
Social Science to Improve Fuels Management: A Synthesis of Research Relevant to Communicating with Homeowners About Fuels Management



Wildland Fire Behavior & Forest Structure

Environmental Consequences

Economics

Social Concerns

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Preface

This document is part of the Fuels Planning: Science Synthesis and Integration Project, a pilot project initiated by the USDA Forest Service to respond to the need for tools and information useful for planning site-specific fuel (vegetation) treatment projects. The information addresses fuel and forest conditions of the dry inland forests of the Western United States: those dominated by ponderosa pine, Douglas-fir, dry grand fir/white fir, and dry lodgepole pine potential vegetation types. Information was developed primarily for application at the stand level and is intended to be useful within this forest type regardless of ownership. Portions of the information also will be directly applicable to the pinyon pine/juniper potential vegetation types. Many of the concepts and tools developed by the project may be useful for planning fuel projects in other forest types. In particular, many of the social science findings would have direct applicability to fuel planning activities for forests throughout the United States. As is the case in the use of all models and information developed for specific purposes, our tools should be used with a full understanding of their limitations and applicability.

The science team, although organized functionally, worked hard at integrating the approaches, analyses, and tools. It is the collective effort of the team members that provides the depth and understanding of the work. The science team leadership included Deputy Science Team Leader Sarah McCaffrey (USDA FS, North Central Research Station); forest structure and fire behavior—Dave Peterson and Morris Johnson (USDA FS, Pacific Northwest Research Station); environmental consequences—Elaine Kennedy-Sutherland and Anne Black (USDA FS, Rocky Mountain Research Station); economic uses of materials—Jamie Barbour and Roger Fight (USDA FS, Pacific Northwest Research Station); public attitudes and beliefs—Pamela Jakes and Susan Barro (USDA FS, North Central Research Station); and technology transfer—John Szymoniak, (USDA FS, Pacific Southwest Research Station).

This project would not have been possible were it not for the vision and financial support of Janet Anderson and Leslie Sekavec of the Washington Office Fire and Aviation Management staff.

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Welcome

This is one of several publications to be developed by the public attitudes and beliefs team of the Fuels Planning: Science Synthesis and Integration Project. To gather information relevant to public attitudes and beliefs about fuels planning, we posed six questions. These questions were developed around the tasks and challenges faced by fuels treatment planners:

- What information and tools are available to help land managers and communities collaborate in developing fuel treatments programs?
- What information and tools are available to help managers work with communities to communicate the risk and uncertainty of fuels treatment projects?
- What information and tools are available to evaluate the social acceptability of fuels treatments?
- What information and tools are available to describe and evaluate the aesthetic impacts of fuels treatments?
- What information and tools are available to encourage more active involvement of private property owners in the fuels management process?
- What information and tools are available to help us understand and evaluate the social impacts of wildfire?

Teams of scientists from universities and public agencies across the country were formed to address each question. Collectively we became known as the social science teams. Each team had approximately eight weeks to produce a synthesis of science relevant to its question and an annotated bibliography that supports the synthesis.

While the focus of the national project was on the dry inland forests of the Western United States, the research synthesized by the social science teams was not limited geographically. We felt the research question being addressed was more important than the location of the research. In addition, we felt that research addressing the human dimensions of a variety of management objectives is potentially applicable to fuels management. For example, we assumed that information and tools developed in Minnesota to bring together communities and agencies in addressing watershed management collaboratively, across boundaries, are applicable to fuels management.

In this publication we present the findings of the synthesis on education and communications research to help engage homeowners in fuels management. Manager fact sheets are available online at:http://www.fs.fed.us/fire/tech_transfer/synthesis/social_science_team/fact_sheet_ss.htm

Further information of the larger project is available online at:
http://www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index

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Portions of this document are from a synthesis of natural hazards communication literature commissioned by the USDA Forest Service in 2002 with Dennis Mileti (the Director of the Natural Hazards Research Center). Built on work originally presented in the November 1999 issue of the Natural Hazards Informer, the complete synthesis subsequently was published in 2004 by the Natural Hazards Research Center as "Public Hazards Communication and Education: The State of the Art."

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Introduction

The large fires in southern California during the fall of 2003 highlighted the significant fire hazard many wildland-urban interface communities and homes currently face. Despite this risk, people continue to leave metropolitan areas for the beauty and tranquility of the wildland-urban interface. The peaceful natural views instill a treasured sense of place and privacy among residents, which can make it challenging to manage the environment and reduce fuels (Lee and Tribe 1987, Lee *et al.* 1987, Shands 1988, Sullivan 1994, Weise and Martin 1994). Firefighting and land management agencies as well as cooperative extension are leading the movement to encourage private landowners to become more active in reducing their risk from wildland fire. Many agencies and communities provide information to encourage more active involvement of property owners in fuels management. Homeowners' actions have put many of them at risk of wildfire, and resource managers want to encourage them to do something different. In some low risk cases, existing practices may just need minor modifications. But in other cases, managing fuels on private property may mean dramatically changing the look, the feel, and the view that attracted homeowners to the wildland-urban interface in the first place.

Thus, asking people to manage fuels is asking them to change their behavior. Many believe that if we wish to change people's attitudes or behaviors we only need to educate them. However, simply providing information, although necessary, is rarely sufficient to change behavior. Information campaigns are often ineffective because they ignore the motives behind behavior (McKenzie-Mohr and Smith 1999, McKenzie-Mohr 2000, Schultz 2002). Fortunately, much is known about key elements of effective communication for behavior change. A successful program uses educational tools not only to provide information but also to generate community involvement and discussion, and to inspire action. Ultimately, public hazards education that works is a complicated process—on both the delivery and receiving ends. Campaigns must be coherent and collaborative, conveying credible, understandable, and appropriate information for the intended audience. In that statement is a prescription for close cooperation among technical specialists and educators, constant communication among educational organizations, and sophistication and creativity in the message translators and communicators (cf. Mileti and Sorensen 1990). There is good evidence that educational programs have generated awareness, increased knowledge, developed supportive attitudes, and in some cases, inspired people to take action to reduce their risk of wildland fire (Beringer 2000, Boura 1998, Boyce and Geller 2000, Broussard *et al.* 2001, Carpenter *et al.* 1986, Loomis *et al.* 2001, Marynowski and Jacobson 1999, McCaffrey 2002, USFA 2002).

There is good evidence that educational programs have generated awareness, increased knowledge, developed supportive attitudes, and in some cases, inspired people to take action to reduce their risk of wildland fire.

Photo credit: K. Nelson

By not managing vegetation on their property, homeowners increase their risk of wildfire; resource managers want to encourage them to do something different.

The purpose of this paper is to summarize what is known about the techniques of effective persuasive communication programs and to provide fire managers with an outline of the characteristics of such programs. Although most managers will be unlikely to have the resources to be able to use all the possible tools discussed, reviewing key elements to consider in developing an effective program to change behavior should help managers identify the most appropriate options/tools for their specific situation. Information is drawn from the fields of environmental communication and social marketing, as well as the natural hazards and risk communication literature. Although they are important, examining the various regulatory tools, such as vegetation management ordinances, or other types of sanctions or disincentives that can be part of an overall program is beyond the scope of this document.

This document is broken into the three main elements of an effective educational effort: understanding the audience, creating effective messages, and delivering those messages. **Part 2** reviews why the audience needs to be considered. **Part 3** reviews issues to consider in developing the message content. **Part 4** reviews the variety of communication techniques and tools that can be used to encourage behavior change.

Understanding Your Audience

To be effective, education must consider information, attitudes, and skills. Programs must be carefully designed to provide information the audience will respond to. To be effective, a clear understanding of the audience is needed, including demographic characteristics, values, and cultural factors. Because characteristics of an audience will vary in each location, successful programs cannot be transported from one community to another. Where possible, a program should work to enhance and support the values of the community (Hodgson 1995). Evaluations indicate that educational programs that match the worldview of the audience (Brackney and McAndrew 2001) and do not conflict with important attitudes (Jakes *et al.* 2003) are more effective. Commonly held worldviews include a focus on others, a focus on self, or a focus on the environment or nature. An educational program could acknowledge and use cherished attitudes and worldviews, a common practice in social marketing.

Although a group may look homogeneous, the members represent different ages, genders, levels of formal education, and experiences, and these factors will influence how people process and respond to information they receive.

Recognize You're Dealing with Multiple Audiences

Photo credit: J. Szymoniak

There are different and diverse segments in any one public audience. These "sub-publics" are distinct from each other based on readily identified personal and social characteristics, and these characteristics may make people more or less likely to be influenced by public hazards education. For example, experience with a hazard, education, age, gender, ethnicity, and family connections are just a few of the "people factors" that can influence how people process and respond to hazards information (Hoffman 1998, Perry and Nelson 1991). In addition to demographic differences, different values, attitudes, and experiences can shape response to educational efforts. For instance, some people may have been exposed to prescribed fire more than others; some may have experienced a wildfire (Butry *et al.* 2002) and others have not, and active users of a natural area, such as hunters, may be more knowledgeable about fire in the ecosystem than non-users (Jacobson and Marynowski 1997).

Audience assessments can help identify traits that may play an important role in fire management views (Jacobson 1999). Once key audiences have been identified, information can be tailored to the needs and concerns of each group (Perry and Nelson 1991, Vaughan 1995, Wolfe 1993). In Incline

Village, Nevada, presentations on the wildfire hazard were given to various groups—such as the Chamber of Commerce, local realtors, and schools—which were targeted toward each specific audience by highlighting how a fire would affect it. For instance, realtors were asked how they would like to sell a house overlooking a blackened landscape (McCaffrey 2002). Special populations may require special communications (cf. Drabek 1994). Some cultural groups choose not to read information for reasons unrelated to literacy; for these groups, radio and TV, word-of-mouth, or pictographic images can be used. Where English is not the primary language, materials may need to be translated by knowledgeable local speakers of those languages.

The Role of Experience

Experience with a wildfire might be assumed to be a sure-fire technique to involve homeowners in hazard mitigation. However, studies on other natural hazards have found an inconsistent reaction to experiencing such hazards. In some cases, experience can lead to increased mitigation efforts, but its positive influence often only lasts for a relatively short period immediately following the event. In other situations it can discourage actions: people discount the likelihood of "lightning striking twice" or develop a sense of fatalism about what they can actually do. More frequent experience generally increases the chance of a realistic assessment of the likely occurrence and the potential impact of a hazard and adoption of mitigation measures (Burton *et al.* 1993, Sims and Baumann 1983). However, some studies found that repeated experience with a hazard (e.g., seasonal flooding) may lead to a "disaster subculture" in which people become so used to the hazard that it simply becomes part of life and mitigation is not even considered (Tierney 1993).

With wildland fire the effect of experience is equally variable. In some communities the history of fire and the threat of fire certainly increase awareness and agency involvement (Fisher 2002; Hudson *et al.* 2003; Jakes and Nelson 2002; Jakes and Sturtevant 2002, 2003; Jakes *et al.* 2003; Kuypers 1995). In other circumstances, communities may think they are free of future fires, having already experienced one or become so familiar with fire that they are not very concerned (Gardner *et al.* 1987, Jacobson *et al.* 2001). In Michigan, a 1990 fire left residents with a view of wildfire as uncontrollable and random, leaving them skeptical of both suppression and mitigation activities. As a reason for not implementing defensible space, they noted that houses with 300 feet of defensible space were destroyed while the fire skipped over vulnerable structures and even came right up to, but did not burn, a woodshed (Winter and Fried 2000). There is also evidence that indirect experience—having a friend or relative who was threatened by a wildfire—may have a stronger effect than direct experience of a wildfire (McCaffrey 2002). In general, a nearby fire or the threat of fire does create an opportunity to increase awareness and encourage homeowners to act (Fisher 2002, Glenn 1999, Hodgson and Anderson 2001).

Avoid Preconceived Notions

When assessing an audience, it is important to avoid preconceived notions about the characteristics of different audiences. Operating on incorrect assumptions of the audience composition, knowledge, and beliefs can limit the effectiveness of any communication effort. For instance, lack of public support for fuels management is often attributed to interface residents who are new to the area and/or don't understand the local ecosystem and its likeliness to burn. These notions may or may not be true. New residents, although new to the area, may simply be from a different but similar part of the same state and so are still familiar with the ecosystem (Jacobson *et al.* 2001, Jakes and Nelson 2002). Recent wildfire studies have found that while some residents, both long-term and more recent, have a limited understanding of their ecosystem (Jacobson and Marynowski 1997, Marynowski and Jacobson 1999), other residents are knowledgeable and have already conducted some actions to reduce their risk (Jacobson *et al.* 2001, Jakes and Nelson 2002, McCaffrey 2002, Shindler 2003, Winter *et al.* 2002, Winter and Fried 2000). Even in Florida's high turnover population, 79 percent of the suburban and rural residents understood that fire helps renew a forest, 63 percent could correctly define prescribed fire, and nearly half of the respondents said they were likely to take action to protect their home from wildfire (Jacobson *et al.* 2001).

Many managers assume new residents don't know as much about the local ecosystem as long-time residents. Research has shown just the opposite may be true.

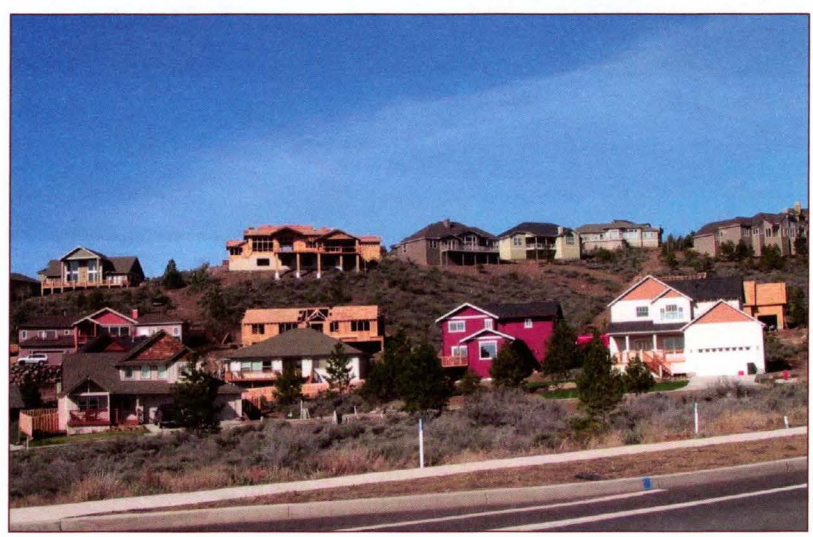

Photo credit: V. Sturtevant

Another common preconceived notion is that rural landowners, particularly nonindustrial forest owners, will hold different views about fire management than more urban landowners. For instance, other research has shown that one cannot assume that forest owners are long-time residents of rural areas or that they use tools like prescribed fire or herbicides to manage their forest, shun regulations that would limit their management options, or report their activities accurately (Bliss *et al.* 1994, 1997; Kendra and Hull 2005).

In the eastern United States, the views of interface residents and forest owners on forest management have been found to be more similar than different, (Bliss *et al.* 1997, Egan and Luloff 2000). Nor are there necessarily regional differences as forest landowners in Utah and Indiana have been found to have similar perceptions (Kuhns *et al.* 1998). However, even if rural and urban landowners hold

similar views, creating different messages still may be necessary; the tools and techniques used to reduce wildfire risks on large properties would differ from those used on small lots. What landowners have in common may also be useful: their willingness to accept the use of prescribed fire (where it can be used safely), their lack of interest in using herbicide, and their conditional acceptance of mechanical removal (Hodgson 1995, Jakes and Nelson 2002, Loomis *et al.* 2001, Winter *et al.* 2002).

Photo credit: Northern Arizona University

Research has found that many rural and urban landowners hold similar views of tools and techniques for reducing the risk of wildland fire, including prescribed burning.

Support Attitudes, Perceptions, and Beliefs

Educational programs can become more successful by addressing attitudes, perceptions, and beliefs that motivate or influence people's behavior. For example, belief that individual actions can help restore the ecosystem, perceived or expected personal satisfaction, expected financial savings or social status enhancement, or expected approval from family and friends can all foster behavioral change. Programs that support or promote these types of beliefs and that are connected to desired behavior goals (i.e., taking steps to reduce fire risk) may ultimately help people change their own behaviors. Countervailing messages related to the inconvenience, cost, or difficulty of fire mitigation measures can undermine people's motivation, behavior, or intent (Cortner *et al.* 2003, De Young 2000, Hodgson 1995, Schultz 2002).

Attitudes that conflict with an educational program's message also may hinder the program's effectiveness. Understanding the audience enables managers to identify areas where such conflicting attitudes may exist and address those issues in the message. For instance, homeowners who value shade, wildlife, privacy, and green views may believe that creating defensible space will run counter to their preferences. They will disregard the information about safety, responsibility, and risk, choosing instead to act according to what they value even if it is a gamble in terms of their safety (Hodgson 1995, Monroe *et al.* 2003, Shands 1988, Sullivan 1994). An effective message might suggest that since homeowners enjoy seeing wildlife and providing habitat, they should create small clearings near their windows. In addition, materials could explain how defensible space will help, not hurt, wildlife (Brackney and McAndrew 2001, Conover 1997, Creighton *et al.* 2002, Hodgson 1995, Jakes *et al.* 2003, McKenzie-Mohr 2000, Schultz 2000, Worley 2002).

One identified predictor of behavior is respondents' attitudes about what significant others think one should do and how much importance one places on their opinions (Ajzen and Fishbein 1980). Information that describes the behavior of others or socially desirable behavior is important to include because it can affect attitudes about the behavior (Hobbs *et al.* 1993, Hodgson and Anderson 2001, Schultz 2002). One study found that homeowner intentions to engage in wildfire mitigation activities were influenced by the approval of those activities by immediate family members, the local fire department, and the Forest Service (Bright and Carroll 2004). The advertising world uses these principles when it makes ads with testimonials from athletic heroes. These strategies suggest that individuals the viewer wants to emulate have already purchased the item and buying it will make us more like them. The famous public service announcement depicting a Native American in a heavily littered environment with a tear in his eye showed both the behavior of others (litter) and disapproval (tear) (Bator and Cialdini 2000).

Many homeowners are motivated by what others think they should do, and displaying "socially desirable behavior" is one way to obtain the approval of others.

Photo credit: S. McCaffrey

Attitudes do not always affect our behavior in expected ways. For instance, research indicates that audiences with positive attitudes or high levels of concern are more likely to adopt a new behavior (Bang *et al.* 2000, Beringer 2000, Brandon and Lewis 1999). However, several research studies found that high concern about the environment is not necessarily associated with greater environmental knowledge (Bang *et al.* 2000, De Young 2000, Koballa 1984, Petty *et al.* 2002, Pooley and O'Connor 2000, Schultz 2000), so new behaviors shaped by high concern may not be based on a clear understanding of the issues. In addition, measuring attitudes can be tricky, often making these studies subject to methodological challenges.

Assess Available Resources

Although how-to information can help build knowledge, a successful education program also will pay attention to the skills and resources needed. For instance, homeowners may not know what to do with the yard waste or be too old to undertake some activities. Understanding the audience can help

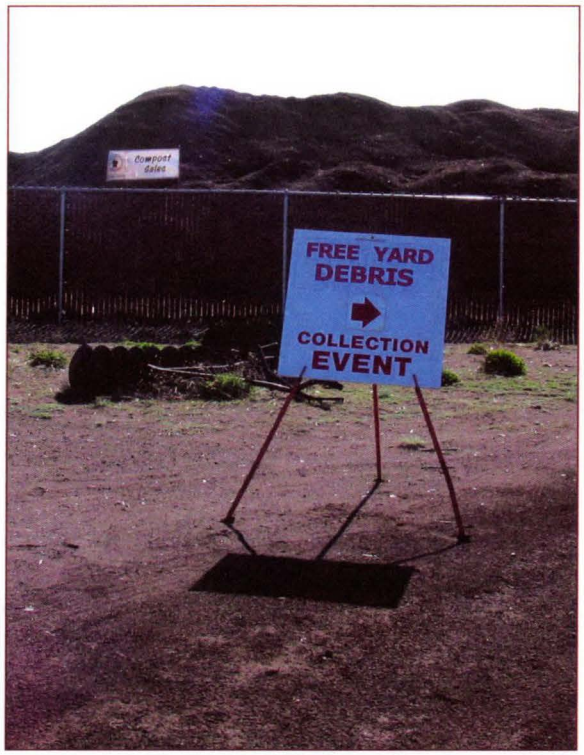

Photo credit: V. Sturtevant

Homeowners may know what they need to do, but lack the resources or support to carry it through; a community cleanup day can support desirable activities such as the disposal of slash from around homes.

identify these barriers. An effective educational program can help overcome barriers, by identifying constraints, providing information, and organizing strategies (De Young 2000). For instance, seasonal homeowners may not recognize their risk, so educational materials would be an important first step. Alternatively, seasonal homeowners may be fully aware of and concerned about the risk but simply feel they don't want to spend their precious vacation time in vegetation management. In this case, basic informational materials would serve little purpose; instead, programs could focus on developing ways to decrease the time involved or perhaps make the process less of a chore via a neighborhood landscaping day, or on providing a list of trained landscape management companies who could take care of the property for the owner. Such programs will build confidence as well as competence (De Young 2000, Fire Safe Council 1996, Gresham *et al.* 1997, Jakes and Sturtevant 2002, Oregon Department of Forestry 2003, Oskamp 2000, Petty and Priester 1994, Porter 2001, Stern 2000).

Constructing Persuasive Appeals

Successful public education works to change people's opinions about a hazard and to motivate people to do something to reduce risk. Many persuasive communication methods focus on changing a person's attitudes or behavior by providing information in specific ways. Persuasion can be defined as actively trying to change a person's mind. In our case, the use of persuasion techniques would not only change opinion but also lead to action. Basic communication consists of the receiver of the message, the message itself, and delivery of the message, each having attributes that contribute to the effectiveness of a persuasive appeal (Jacobson 1999, Petty and Cacioppo 1981).

The Message Receiver

Researching the target audience can facilitate persuasion by making the appeal personally useful and involving, thereby getting the recipient to think about the message (Bator and Cialdini 2000, Harris 1999, Leventhal and Cameron 1994, McKenzie-Mohr and Smith 1999, Petty and Cacioppo 1981, Severin and Tankard 2001). The message must grab the audience's attention, inspire thought, get stored in memory, and be recalled at the right time.

Research suggests that persuasion will be successful and enduring when the receiver of the message has thought about the message sufficiently. When someone is highly motivated or interested in the message, they will be more likely to think about it, be persuaded to change their attitudes and behavior, and retain the change longer. When people are motivated, they will attend to the message, attempt to understand it, evaluate the message either favorably or unfavorably, and then integrate the information into their position, thereby leading to more durable attitude change (Beringer 2000). Persuasion is more likely to occur when the message is either personally relevant or the recipient has experience with the issue. Persuasion also is more likely when the message provides clarity and when it is either written or repeated several times because that gives someone time to think about it and discuss it with others (Bator and Cialdini 2000, Petty and Cacioppo 1981, Petty and Priester 1994).

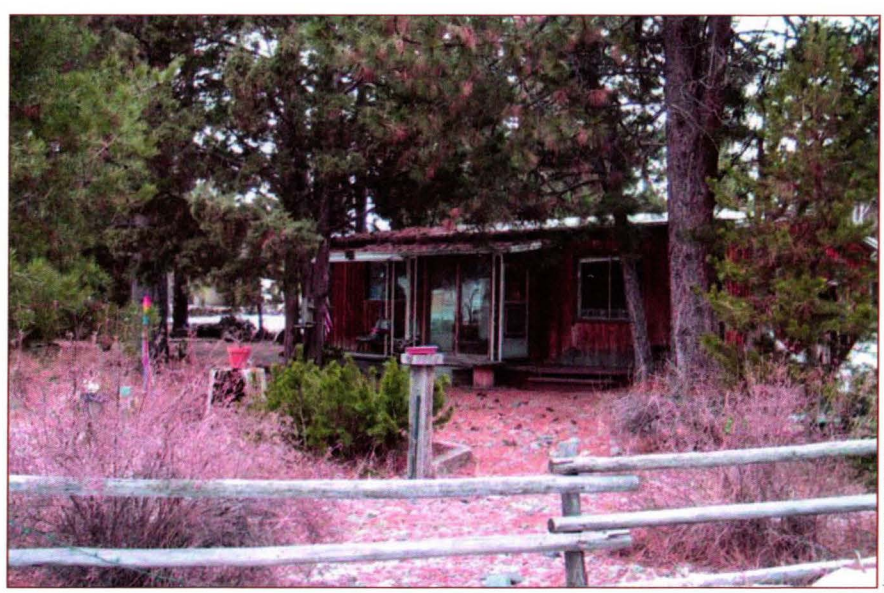

Photo credit: V. Sturtevant

Where people are not motivated to take action, even small changes, such as removing pine needles from the roof, can help homeowners feel they are part of the solution to a problem, and larger projects become more achievable.

Public Education and Warnings Should Not Be Confused

Public hazard education—communicates general information to the public *independent* of the occurrence of any one specific hazardous event. This should not be confused with warnings, which communicate information about a specific disaster in the days, hours, or minutes before impact. Although many of the principles of effective communication apply to both education and warnings, the two types of communication differ (Mileti and Sorensen 1990) and are only minimally related. Public response to warnings is much more the result of the information that people have access to *during the warning period* than anything else, including pre-event public education. Prior public education can "prime" people for response to some future warnings, for example, by educating people about the location of evacuation shelters.

However, when someone is not very motivated or interested in the message, he/she is not likely to spend any time thinking about it and not likely to change his/her attitude and behavior. However, communication can increase awareness of the issue, the first step in changing someone's behavior (Harris 1999, Petty and Cacioppo 1981). Publications need to be careful not to overload less motivated individuals with too much information or risk not even grabbing their attention. It may help to design different publications for different audiences. Irrelevant motivators, like sex appeal, status, or rewards, can be used to persuade those with low motivation, but this change is likely to be short term. Motivation to think about the message is increased when the recipient finds the message personally relevant. In cases of low motivation, it may be possible to achieve small changes in behavior and through issue awareness make these people believe they have an appropriate attitude. For example, if people are not motivated to create defensible space or tackle fuels management, they should first be encouraged to remove pine needles from their roofs and associate this behavior with fire prevention. The act of cleaning gutters could then lead someone to feel they are becoming firewise, begin to identify with others who are making more effort, and other related behaviors then may appear more achievable (Bator and Cialdini 2000).

The Message Itself

At a general level, to increase likelihood of persuasion, the message should be easy to understand, have a few good arguments, be repeated several times, and end in a conclusion (unless the audience is able and motivated to correctly conclude the message itself) (Bator and Cialdini 2000, Harris 1999, Jacobson 1999, Mileti and Peek 2002, Petty and Cacioppo 1981, Solden 1995). Messages should provide motivations to spur action including feeling good about oneself, confidence, financial reasons, altruism, and even shame or guilt (De Young 2000). Several areas need to be considered in shaping persuasive appeals.

Three types of information

Procedural Information

Most homeowner educational efforts include prescriptive, how-to information (Creighton *et al.* 2002, USDA Forest Service 2002). Such information must be clear and comprehensible (Schultz 2002). The strategies that can be used to create a fire-safe home can involve a confusing set of guidelines (Gilmer 2001; McLean 1992, 1993). Informational materials that explain landscape modifications, timelines for landscaping changes, and identification of highly flammable plants provide detailed information that will help homeowners feel more confident about what needs to be done.

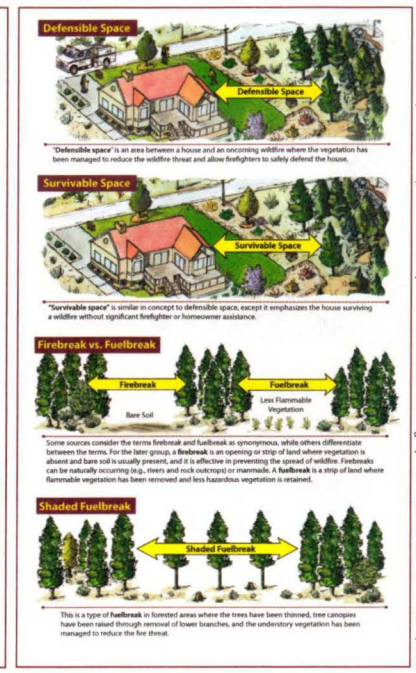

Photo courtesy of University of Nevada Cooperative Extension. Drawing by Kirah Van Sickle and Animania, LLC.

Publications need to make important information stand out by using a mix of both verbal and visual information.

Although this type of *procedural information* is necessary to help people know what to do and how to do it, it may not be sufficient. For instance, in Colorado focus groups, residents expressed a desire to understand fire behavior and why fuels should be managed a certain way (Burns *et al.* 2003).

Explanatory information

People need reasons to justify their behavior and, in the absence of information, they often will make up these reasons (Cortner and Gale 1990). In interviews in Florida, homeowners explained that because a fire jumped a six-lane highway, they were not interested in creating the amount of defensible space that would surely be necessary to protect structure and valuables (Monroe and Bowers 2002). For procedural information to be effective, it should be accompanied by explanations that justify the action, particularly when the action is complicated or the justification is not common knowledge. Such explanation is difficult to include in a short brochure, but can be effectively portrayed in longer publications (Fire Safe Council 1996, Gresham *et al.* 1997). This level of detail only works, however, when the reader is already interested in the topic and willing to put forth the effort to learn (Petty and Cacioppo 1981).

By the same token, explanatory information that neglects to specify what and how to do something is not helpful. The single biggest difference between recyclers and nonrecyclers in an Ann Arbor, Michigan,

Photo credit: E. Riley

Although agencies and organizations hesitate to promise results, people would like to know how actions they take to reduce wildland fire risk can help to save their property.

study was that the nonrecyclers didn't know the details—do newspapers have to be tied; do cans have to be flattened (DeYoung 1988-89)?

Impact Information

Educators have long acknowledged the importance of providing feedback to learners. People need to know their actions were done correctly (Brandon and Lewis 1999). Focus group members in Colorado mentioned the importance of knowing if their actions were sufficient (Burns *et al.* 2003). In the context of fuels management, the need to receive feedback also could be driven by landowners wondering how effective their activity is in reducing the potential damage of a wildfire. Because many agencies hesitate to promise results (e.g., "if you clear 50 feet of defensible space, your house won't burn"), residents often don't know whether their actions are effective. Although it is important to reassure them about proper landscaping activity while reinforcing the unpredictability of wildfire, more feedback about the outcome of their actions, such as better media coverage of structures saved by defensible space, will help people believe their actions are worthwhile (Cohen 2000a, b; Siero *et al.* 1996; USDI BIA 2003; Wallace 2002).

Similarly, people would like to know about the consequences of a behavior before they engage in it. When asked to remodel their yard, they may appreciate seeing an example. Without an example, people are left to their own imagination. Because many messages about defensible space use the phrase "clearance," homeowners may hesitate to clear their lot (Hodgson 1995, Worley 2002). If managers do not intend for people to remove all vegetation, they should not use the word "clear" and should provide a visual example of the desired landscape. In this case the "sound-bite" message may do more harm than good; more detailed information may be needed to convey an accurate and complete message.

Keys to a Successful Message

Consider How Balanced to Be

Most arguments or debates have two different sides. Messages that promote only one side of the debate appeal more to those who already favor the message and those with less education. Two-sided messages present both sides of an issue but not equally, that is they explain the benefits of one side of the issue and the disadvantages of the other. Such two-sided messages work best with those initially opposed to the message and those with more education (Koballa 1984, McKenzie-Mohr and Smith 1999, Petty and Cacioppo 1981, Severin and Tankard 2001). Messages that provide balanced information on both options do not change peoples' opinions but can change the intensity of those opinions (Bright and Manfredo 1997, Petty and Cacioppo 1981).

Adapt Material to Local Needs

The information you present should be adapted and customized to local circumstances. For example, if the population(s) you seek to educate have a disaster in local memory, reference it in your materials; or if there are significant numbers who read only special newspapers, be sure to add those newspapers to your public education campaign. Information should be tailored to the different groups in an area. For example, an effective approach to deliver information and materials for middle-class homeowners will differ from an approach for residents of a communal farm in the hills above town; and an effective approach for schools will not be like one for large corporations.

Include both Verbal and Visual information

Publications need to make important information stand out while supporting details follow. Finding the right mix of verbal and visual information about a risk and what the public should do about it is not always easy, but it increases the success of public hazards education. Vivid information draws and holds attention and stimulates imagination if the information: (1) grabs the readers emotionally, (2) is specific and triggers imagination, and (3) is immediate in a sensory, temporal, or spatial way. However, the message should be simple and make only the main point vivid, because irrelevant details can distract from the message. Some ways to make text vivid are to use action verbs; concrete, specific details; colorful adjectives; and quotes (Bator and Cialdini 2000, Harris 1999, Petty and Cacioppo 1981, Petty and Priester 1994).

Heighten Feelings of Uncertainty

From a theoretical viewpoint, public hazards communication and education work best when the public materials and approaches used bring about a degree of uncertainty in the minds of people, causing them

Photo credit: T. Iraci

Education materials that use fear, with photos of flames and burned homes, don't always motivate people to take action to reduce their risk.

to wonder about their environment and to question their safety in it. Good public education gives people something to mull over and to discuss with friends, family, and colleagues. It sparks enough interest that people generate questions and then seek more information to answer their questions, and provides specialists with additional information to answer those questions (Mileti and Fitzpatrick 1992). Despite all that, the desired changes in the public may take some time to materialize.

Use Fear Appeals Carefully

Use of fear appeals needs to be considered carefully . Many materials currently available to homeowners provide information about risk reduction using pictures of flames and burned homes to convey urgency. This implies a threat— "if you don't follow these guidelines, your home could be lost"—that may induce fear. Although it is important to get the reader's attention, these messages may not always inspire action because fear can induce emotions that may either encourage or discourage acceptance of the message (Severin and Tankard 2001). Fear inspires action when it is accompanied by information about what to do, the information makes sense, and it can be acted upon (Leventhal and Cameron 1994, Petty *et al.* 2002).

Use encoding and retrieval cues

Encoding cues aid retrieval of a message, especially when there is a time lag. Using a familiar image, like the "miracle house" that survived the Oakland fire, generates a memory of that event (McLean 1993). Photographs of firefighters in firefighting gear on a brochure can help residents recall the appropriate message when similarly clad people knock on the door. By using the same phrase or image for multiple media products, communicators help ensure that people encode and retrieve the information in similar ways. Smokey Bear is an excellent example of a memorable cue. It is also important to tie the cue to the main point (Bator and Cialdini 2000).

Repeat the message

Research in a variety of contexts on communicating messages suggests that repeating the message is helpful. Residents who had participated in an extension workshop on wildland fire risk and mitigation reported one year later that they had taken steps to reduce their risk, but they did not attribute their action to the workshop. They heard similar information from a variety of places and at some point they spent effort thinking about it, realized it was appropriate for them, and then performed the behavior (Monroe and Jacobson 2003).

Risk Perception

Research into the social psychology of perception and belief indicates that—as counterintuitive as it may first seem—perceiving risk does not automatically lead to taking protective action (Mileti and Fitzpatrick 1992). Risk perception is a complex process: a person living close to a hazardous site may understand the risk from that site, but may not take any steps to enhance his/her safety. To the frustration of many engineers, scientists, and statisticians—who tend to use probability distributions to determine risk—public risk perception does not necessarily follow from their "objective" definitions. To explore this disparity, research has examined numerous aspects of risk perception including how expert and lay calculations of risk differ and whether, in fact, risk is perceived differently by the two groups (Johnson 1993, Rowe and Wright 2001); how hazard characteristics influence risk perception (Slovic 1997), and, more recently, what role emotions may play (Loewenstein *et al.* 2001, Slovic 1999). "The bottom line is that, just as there is no universal set of rules for games, there is no universal set of characteristics for describing risk. The characterization must depend on which risk game is being played" (Slovic 1999).

Although the public does make probability estimates, they may calculate them differently from experts (e.g., using a different temporal or spatial scale) and tend to combine the probability estimate with other important pieces of information—such as recent experiences, preferences, political points of view, and many other factors—to determine risk perception. Ultimately, information can increase risk perception, but higher risk perception does not necessarily lead to mitigation. Rather it appears to be a necessary but not sufficient condition. Individuals are balancing the perceived risk and the benefit of where they live: the higher the perceived benefit, the greater the risk tolerance (Slovic *et al.* 1987).

Delivering the Message

Choosing Delivery Approaches

Message sources include the person, group, company, or medium such as a newspaper. Source factors that influence attitude change include source credibility or believability (mainly trustworthiness and expertise), intent to persuade, attractiveness, incentives, (the source can administer rewards and punishments), and similarity to the recipient.

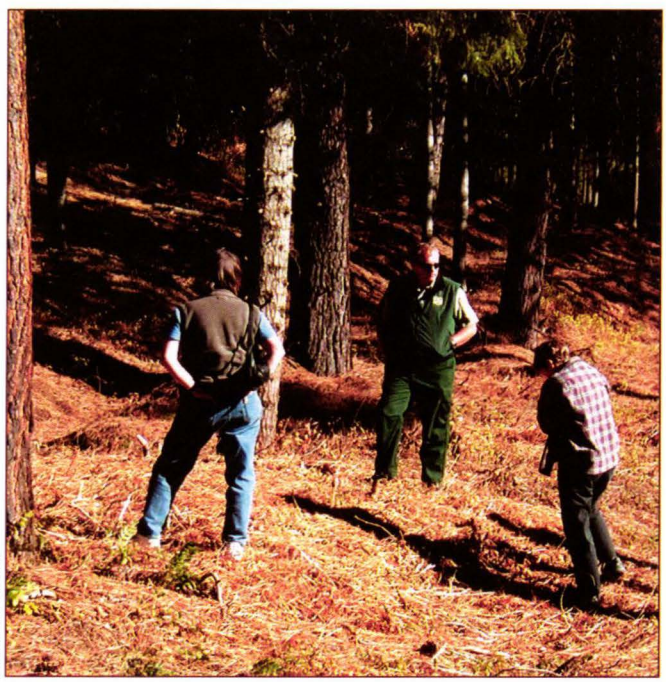

Photo credit: P. Jakes

Although media campaigns are effective in raising awareness of an issue, personal contacts are more effective for changing behavior.

A variety of tools are available. Some, such as neighborhood meetings and festivals, are more likely to convey information about the social acceptability of fuels treatment than others (e.g., news coverage and brochure). Although mass media coverage is good at raising awareness among a large group of residents, personal contacts, along with the use of techniques such as obtaining commitment, are more likely to achieve a change in behavior.

Use Media Appropriate to the Audience

It's important to use diverse sources to reach all groups in the community. This can mean having multiple sources author a single communication or having the same message come from multiple sources, or both (cf. Blanchard-Boehm 1998). The Internet may be a good source of information for some groups but it is is not necessarily the best way to reach a non-English-speaking or low-income audience. Information for those groups can be disseminated through the community organizations and social service agencies that regularly work with that audience. Conversely, technologically sophisticated packaging gets middle-class, computer-using audiences where they live.

Use an Information Stream

Have information ready and accessible at the time someone is motivated to ask for it. A continual flow of information will increase people's ability to access information when they need it. The information flow should capture people's attention, spark their interest, and make them begin to consider taking action to mitigate the risk. They need to discuss the risk at local organizations, seek out additional information on their own, and talk with friends and neighbors about it. This process permits people to gather information and form their own ideas about the level of risk and what they should do about it.

In many cases, the wheel has already been invented. Share materials. Revise them. Adapt them. Translate them.

Photo credit: Firewise

Web pages can reach a wide audience, and presenting information in several languages can broaden its reach.

Use Diverse Ways to Communicate

People learn new information best in different ways, so it is helpful to have a variety of communication tools. Many learn by doing (Zelezny 1999), others respond best to the written word (Rohrmann 1999b), and others enjoy an informal gathering of neighbors (Boura 1998, Fossen 2003, McCaffrey 2002).

Information channels may include coloring books in schools, other brochures, slide shows, or DVDs. Multiple information sources reinforce the risk information people receive. Seeing neighbors, friends, and relatives preparing for the hazard or a demonstration project reinforces the need for public action.

Spokespersons should also be varied. Consider using a variety of external information-dispensers—extension agents, nursery owners, building supply stores, landscape architects, real estate agents, and others. Education programs are more effective if they feature specialists who are experts in the area. A study of the views of Incline Village, Nevada, residents on different fuels management methods found that personal contacts were more influential in relation to personal concerns such as aesthetics or fear of a prescribed burn getting out of control, and government contacts were more important for views on thinning practices, activities more likely to be overseen by a government agency (McCaffrey 2004).

Use Sources People Can Trust

It is easiest for people to attend to information if it comes from a group or a person they trust. Depending on age, education, class, and ethnicity, different people trust different sources. Some people want to hear about earthquakes from seismologists at the U.S. Geological Survey and about a problem at a nuclear power plant from a nuclear engineer who helps run it; others believe only what the Red Cross tells them; still others search for data sources online.

The "Golden Rule": Use Windows of Opportunity

Both empirical research and seasoned observation support the golden rule of public education for hazards: *all the sophisticated materials and behavior modification techniques do not have the force of one good disaster to change people's thoughts, their behavior, and even public policy, at least in the short term.*

Natural hazard issues tend to have high salience immediately after a disaster and then taper off (Neil 1989). This high salience provides a limited window of opportunity where efforts to promote positive change are more likely to be heard. Do not wait for the window to open; build a sustained advocacy program beforehand. Change after a disaster is more likely when public educators have already worked to make sure the problem is recognized, the solution is known, and some advocates are already in place.

During the window of opportunity that opens following a disaster, abundant information from various sources in the affected locale will increase the chances for changing what people think and how they behave. This is also the case for people and communities that were not directly impacted by that disaster but that "experienced" it over the media. Take advantage of a window opening someplace else. Use it while you can, for the window is not open long! A public policymaker's memory and attention are even shorter than the public's. Typically, even after a big disaster, he or she will not keep that hazard high on the list of big issues for more than 2 or 3 months. If possible, send community organizers to view emergency response to wildfires in other places. Such people typically return from their reconnaissance with better vision and a more active imagination. They have seen the truth and can communicate it to many others. They are motivated to do something and can frequently infect others with their enthusiasm.

When misconceptions conflict with new information, people will choose which information to discount—the new information from the agency or the beliefs they have created and held (Hodgson 1995). Which they choose depends on their trust in the agency and the strength of the evidence provided. It can be difficult for an agency to counter every possible misconception that residents might have. Regular feedback from residents can help managers understand the most pervasive misconceptions and how to dismantle them. When Florida homeowners realized that fires "jump" when firebrands land on flammable material, the importance of clearing dead vegetation from their yards made more sense (Monroe and Bowers 2002).

Use an Incremental Approach

Because learning is incremental, information dissemination should be, too. The message should change over time to focus on specific behaviors in incremental steps. A message about fuels reduction that targets homeowners living in the interface could include several steps: remove dead vegetation, replace flammable plants, and address home construction problem. The campaign would be conducted along

with other interventions such as community events like "chipper days" or the formation of neighborhood work teams (Harris 1999). Some education organizations or emergency services agencies distribute monthly newsletters with reproducible masters on different aspects of emergency preparedness to participating communities. In January, the spotlight might be on home safety; in February, it might move to planning a family evacuation route.

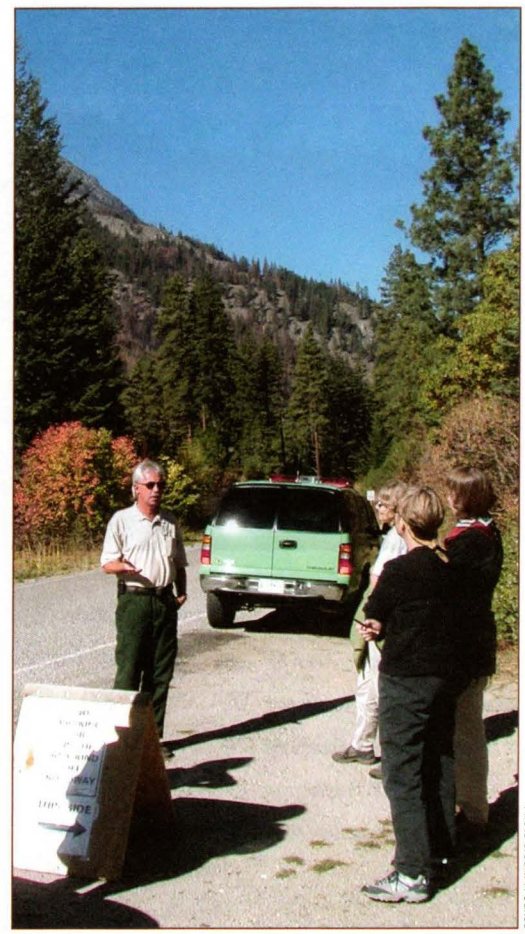

Photo credit: P. Jakes

It is easiest for homeowners to attend to information when it comes from people they trust, and different people trust different sources.

Make Your Approach Interactive and Experiential

Adults learn by comparing new information to what they already know, by thinking through and discussing the new concept or practice, and by doing. They don't sit passively and digest everything they hear or read. Most do not enjoy being told what to do. Use models, visual aids, fancy media, and peer group discussions. The Texas Forest Service works with volunteer fire departments to encourage residents to fill out a community hazard checklist and begin discussions about what places their neighborhood at risk and what could reduce the risk. People responded to the interactive format much better than being handed a completed risk assessment (Monroe *et al.* 2004).

Share Ownership of the Idea.

People need to feel that taking some protective action is their own idea, but information "ownership" takes time. Preparedness and mitigation actions result from the whole process. Public educators have learned through trial and error what parents of teenagers already know: people are generally not motivated by sermons on

why they ought to do something, or why they ought to accept the actions of others. Neither moral exhortations nor discourses on ethical or legal imperatives produce the desired opinion or behavior change in the average citizen. People are more apt to follow an appropriate agenda if they work out a solution or come to a conclusion themselves, with helpful information from specialists (Mileti and Darlington 1997). Not surprisingly, most people are more apt to change their opinion or behavior, or accept a local action, when they think their own idea created the need to change.

Obtain Commitment

Getting people's commitment for a behavior affects the way they perceive themselves. That is, after committing to a firewise landscape by signing a form or performing a behavior, they begin to see themselves as the kind of people who support this practice. Commitment affects self-perception so

Photo credit: S. Shaffer

Many people learn best by doing; homeowners are more likely to adopt an approach for reducing fuels when they've had a chance to see and discuss the practice with managers at demonstration sites.

strongly that those who commit to a small act such as putting a sticker on a window will be more likely to agree to much larger acts, such as donating money. The converse is also true–asking people to do an onerous task and being refused is more likely to generate willingness to do a smaller task. Commitment as a technique works best if the first request was made without providing rationale, if the commitment was made in writing not just verbally, or if the person actually performed the behavior and did not just agree to the request (McKenzie-Mohr and Smith 1999, Petty and Cacioppo 1981). These techniques have been used widely in behavior change arenas, including energy efficiency, recycling, pedestrian safety, and recreation (Bator and Cialdini 2000, Boyce and Geller 2000, Bright and Manfredo 1997, Dwyer *et al.* 1993, Hobbs *et al.* 1993, Jakes *et al.* 2003, McKenzie-Mohr 2000, McKenzie-Mohr and Smith 1999, NCSANF 2000, Petty and Cacioppo 1981, Rohrmann 1999b, Stern 2000).

Use Partnerships

Think about building partnerships with other agencies, organizations, and within the community. Partnerships help leverage limited resources, and consistent information coming from multiple sources often works better than if only one organization disseminates the information. High-profile organizations in the area with an established track record are important to include in the partnership. The involvement of residents in designing and implementing programs, particularly in deciding how to create a firewise community, helps build positive relationships between fire suppression agencies and communities, empowers residents by establishing ownership in the process, and reshapes a community norm toward greater preparedness (Boura 1998; Burns *et al.* 2003; Chambers 1992-93; Day and Monroe 2000; De Young 2000; Fossen 2003; Gilmer 2001; Hodgson 1995; Jakes and Sturtevant 2002, 2003; Jakes *et al.* 2003; McCaffrey 2002; Monroe *et al.* 1999; Oskamp 2000; Richard and Burns 1998; Rohrmann 1999b; Tokle 1987; Weise and Martin 1994; Werner 2001).

Pilot Test

A pilot test of the product will help reveal how to improve it. Run everything by a representative group of local advisors. Find out which picture is most appealing for the brochure and whether your buzzwords communicate the right message. Collect feedback from a small group of your audience, and revise the

communication tools before they go out to the entire community (Day and Monroe 2000, Jacobson 1999, Monroe 2000)

If you have access to successful program materials from other agencies or communities, consider pilot testing them on your audience. It is unlikely that a borrowed product will suit your needs exactly, but making minor modifications to an existing program should be easier than creating a new one from scratch. Your pilot group may be able to identify what to alter to make these borrowed resources most effective for your purposes.

Monitor

Build in a strategy to monitor success. Indicators of success might include participation at community events, driveby assessments of the neighborhood, number of complaints, willingness to listen to opposing views, and physical changes of the landscape. Feedback cards, mail-in request cards, and coupons can be tagged to enable you to track where people are finding useful information (Jacobson 1999; Rohrmann 1999a, b).

Choosing the Delivery Medium

An effective information campaign will use multiple delivery components. Publications such as brochures, flyers, booklets, signs, and even Web sites are a way of disseminating information but are useful mostly for increasing awareness and rarely lead to behavior change. For persuasion, the most influential method has been found to be interpersonal communication, particularly with expert information sources (Rogers 2003). Thus, written media should be combined with other tools for the greatest effect (Harris 1999, Jacobson 1999). Develop program tools and strategies that will enable the target audience to meet the objectives. Use the community leadership to demonstrate the new behavior and carry the message to others (Hobbs *et al.* 1993, Rogers 1995). Use existing homeowners associations, civic groups, environmental organizations, or youth clubs to get the word out and train them to provide information correctly, bridging the gap between the agency and the public.

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Media Coverage

The media have become pervasive in our society and are often used in campaigns designed to educate the public and change behavior. Media coverage includes news conferences, press releases, feature

Ways To Make More Effective Use of the Media

Although initially time consuming, the following actions over the long run can help disseminate effective and accurate information. These actions also ensure that when windows of opportunity arise, they can be used effectively.

Package information for the media. An effective public education program has plenty of material on hand when the TV and radio stations start calling and the feature writer from the paper shows up looking for the local angle. Prepare media packets that cover the full list of topics the media might be interested in finding out about. Make a list of media contacts and get to know them so they will pay attention to your release or be likely to cover your event.

Write press releases and articles in the style the media prefer. This includes answering the where, what, when, who, why, and how questions of a typical news story in the first paragraph (the 5 W's and H) and supplying details after. Use verbal and visual ways to present the information clearly and understandably. "Wildfire Prevention and the Media," a handbook by the National Wildfire Coordinating Group (NWCG) provides several examples of news releases and public service announcements, as well as detailed information on conducting interviews with the media, news conferences, and "show-me" trips (NWCG 1998, Patterson *et al.* 2003).

Use human-interest stories. A story is an ancient communication tool that conveys a problem, a hero, and a solution. In the context of wildland fire, a variety of stories could feature successful community programs, landscaping strategies, and unique tools (Burns *et al.* 2003, Fisher 2002). Such feature stories do not have to follow the "5 W's and H" style.

Target media other than mainstream television and newspapers. Many small local publications such as newspapers, alternative press monthlies, and newsletters can cover your topic and reach a different segment of the population (Bator and Cialdini 2000, Boyce and Geller 2000, Bright and Manfredo 1997, Dwyer *et al.* 1993, Hobbs *et al.* 1993, Jakes *et al.* 2003b, McKenzie-Mohr 2000, McKenzie-Mohr and Smith 1999, NCSANF 2000, Petty and Cacioppo 1981, Rohrmann 1999b, Stern 2000).

There are several guides specifically for communicating about fire management through the media. One such guide, "Chapter 4: Press Kit for Wildland Fire," from the Wildland Fire Education Handbook is available online: http://edis.ifas.ufl.edu/FR086 (Hammatt 2000).

stories, and public service announcements. Media campaigns are very effective at raising awareness of an issue; successful examples include HIV and AIDS, smoking, and nutritional information. Although media campaigns can be effective in allowing the message to reach a large number of people, they may not be as effective in changing behavior. For example, a commercial ad that is aired repeatedly is considered successful if it affects 1 to 10 percent of consumers. Media campaigns also do not tend to result in behavior change, and other tools such as personal communication need to be added to increase effectiveness (Harris 1999, Hobbs *et al.* 1993, Rogers 1995).

Brochures

When used in conjunction with other supporting activities, brochures can be an effective way to educate the public (Mileti *et al.* 1992). A written document gives people something to refer to as they become more interested in the topic. The most effective way to get the brochure to people is to mail it to their homes. Doing so helps people personalize the risk. If funding does not permit a mailing, publish a special insert in newspapers. It is best if the brochure comes from official government sources and others, including scientists.

However, distribution of brochures must be supplemented. The public must be primed before the brochure is distributed so that the topic is sufficiently salient for them to keep it when it arrives. Furthermore, the public must receive additional information after the brochure arrives to be enticed to read it. This additional information should come from as many different sources and through as many different channels as possible. It is this additional information that makes the mailed brochure effective. Clearly, the media should be provided with consistent supplemental information before and after the brochure is disseminated.

Two-way communication is more meaningful than one-way communication; field trips give residents and managers an opportunity to interact and share issues and concerns.

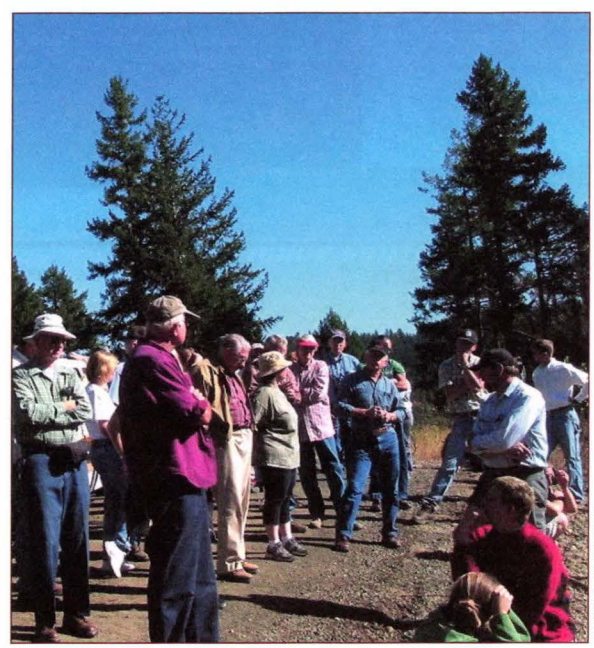

Photo credit: S. Shaffer

Personal Contact

Although written communication is needed to allow people time to think about the message, personal communication, in conjunction with written materials, provides greater results. Interpersonal communication is the key to behavior change. Such two-way communication is most effective in reducing the inherent uncertainty of adopting an innovation because it allows for discussion and clarification. Face-to-face communication is more meaningful, more interactive, and therefore more memorable than one-way communication (reading or watching TV). In fact, a study in Incline Village, Nevada found that television had a fairly consistent negative association with more proactive attitudes

toward fire management. Most notably, individuals who cited TV as an information source were less likely to have put in defensible space measures (McCaffrey 2004). Conversely, the study found that government and personal contacts were associated with increased support for more controversial aspects of fuels management, such as fear that a prescribed burn would get out of control. Successful programs have used personal communication with community meetings, workshops, and door-to-door visits (Bailey 2002; Barden *et al.* 1996; Boura 1998; Chambers 1992, 1993; Fisher 2002; Glenn 1999; Hodgson and Anderson 2001; Hudson *et al.* 2003; Jakes and Sturtevant 2003; Mileti and Peek 2002; Rohrmann 1999b; Werner 2001).

Neighborhood Organizations

In some communities, neighborhoods can be effective groups for a fire campaign because they often have an organized homeowners association, are made up of a somewhat homogenous set of people, and are set in similar fuel types (Hodgson 1995). They can be a ready made group of residents who know each other, and interact according to a set of established and comfortable expectations. If groups of neighbors are involved, it becomes an opportunity to strengthen the social support, obtain peer approval, make a verbal commitment, and reinforce community motives. Respondents in several

Opinion Leaders

Never overlook the role of the individual in changing what the public thinks and does, particularly given the key role that interpersonal communication plays in fostering behavior change. (By identifying local opinion leaders, managers can both expand the number of "communicators" and promote behavior change because local opinion leaders have been shown to have a positive effect on adoption of new practices.) There are many examples of hazard champions who singlehandedly prod and cajole their organizations, schools, neighborhoods, or governments about hazards. These individuals are both tenacious in their efforts to stimulate change and passionate in their belief that change is necessary. Finding, cultivating, and motivating such individuals can sometimes be the key to a successful public education campaign (Rogers 2003).

There are four general methods for identifying opinion leaders (Rogers 2003):

1. Ask key informants to identify local opinion leaders. Although this is the most efficient method, key informants must be familiar with the system in question.
2. Ask system members whom they turn to for advice and information on a topic. This can be the most precise method, but a large number of respondents need to be asked in order to accurately identify a small number of leaders.
3. Ask individuals if they are leaders. This, of course, assumes respondents will identify themselves accurately.
4. Finally, observe the system. While accurate, this takes time and works best in small systems.

studies mentioned that how they thought their neighbors would react to their landscape modifications was important (Hodgson 1995, Jakes and Nelson 2002, Jakes and Sturtevant 2002). Neighbors also care about what happens to each other, and those who wanted to help others were found to be the most successful at encouraging change (Porter 1996). A program could make certain that neighborhood leaders are among the first to model appropriate fuels treatment and that the neighborhood newsletter features the activity. Several programs have successfully used a neighborhood approach to communication and organization (Boura 1998, Hodgson 1995, Hudson *et al.* 2003, Jakes and Nelson 2002, Jakes and Sturtevant 2002, Jakes *et al.* 2003, Waldron 2001).

Prompt

Prompts are visual or auditory reminders or signals to perform primarily habitual behaviors. Sometimes people fully intend to perform a behavior, but still forget. For example, many people have cloth bags for grocery shopping but forget to bring the bags to the store. Two examples of prompts are stickers on light switch plates reminding people to turn out the lights when leaving a room and brightly colored trashcans with anti-littering slogans. To increase their effectiveness, prompts should be placed as closely to the behavior site as possible. Therefore, if the target behavior is to conduct a seasonal firewise yard cleanup, a prompt could be placed in a utility bill or at a lawn care display in a home improvement store. Stickers placed near garden tools, trashcans, or even refrigerator magnets also may work in this case. Because prompts are just reminders, they need to be used along with other approaches (McKenzie-Mohr 2000, McKenzie-Mohr and Smith 1999).

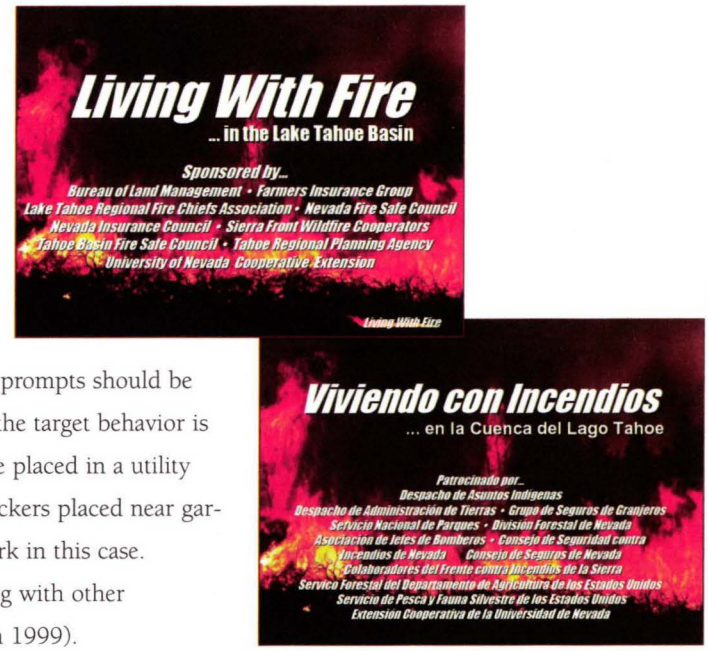
Living With Fire
... in the Lake Tahoe Basin
Sponsored by...
Bureau of Land Management • Farmers Insurance Group
Lake Tahoe Regional Fire Chiefs Association • Nevada Fire Safe Council
Nevada Insurance Council • Sierra Front Wildfire Cooperators
Tahoe Basin Fire Safe Council • Tahoe Regional Planning Agency
University of Nevada Cooperative Extension
Living With Fire
Viviendo con Incendios
... en la Cuenca del Lago Tahoe
Patrocinado por...
Despacho de Asuntos Indígenas
Despacho de Administración de Tierras • Grupo de Seguros de Granjeros
Servicio Nacional de Parques • División Forestal de Nevada
Asociación de Jefes de Bomberos • Consejo de Seguridad contra
Incendios de Nevada Consejo de Seguros de Nevada
Colaboradores del Frente contra Incendios de la Sierra
Servicio Forestal del Departamento de Agricultura de los Estados Unidos
Servicio de Pesca y Fauna Silvestre de los Estados Unidos
Extensión Cooperativa de la Universidad de Nevada

Photo courtesy of University of Nevada Cooperative Extension

Information should be adapted to fit local circumstances, including tailoring information to fit local landscapes and languages.

Incentives and Disincentives

Incentives and disincentives can increase motivation to perform an activity or perform it more effectively. Common examples, respectively, of incentives and disincentives are deposits used on beverage containers to encourage recycling and traffic fines for disobeying traffic laws. Incentives also have been used to encourage the purchase of energy-efficient appliances with rebates and grants. Using negative incentives such as fines generally does not work as well because people are motivated to identify strategies to avoid detection. Tips for effectively using incentives include pairing the incentive with the behavior (e.g., offering coupons for purchasing less-flammable plants), and publicizing the incentive. Incentives can be tricky when used to encourage long-term behavior change because people associate the reason for performing the behavior with the incentive. Therefore, when the incentive is removed, the behavior

often stops. Worse still, some people may have performed the behavior before the incentive was introduced but later came to associate their behavior with the incentive, leading them to stop performing the behavior when the incentive was removed (Bailey 2002, Burns *et al.* 2003, De Young 2000, Kempton *et al.* 1992, Lutzenhiser 2002, McKenzie-Mohr 2000, Oskamp 2000, Stern 2000, Sutherland 1992). A recent coupling of incentives and disincentives was the 2003 decision of State Farm Insurance Company to discontinue insurance coverage of homeowners in wildfire-prone areas who don't clean brush and trees around their homes. As incentive the company is allowing homeowners 2 years to complete the work and providing a list of corrective actions and of local contacts who can assist in the process (McGhee 2003). How effective this effort will be is still unknown.

Prizes, raffles, and recognition for firewise landscapes are examples of incentives that can be paired with other techniques to increase their power. Signing up for the contest or a raffle can be a type of written commitment, the recognition is an incentive, and recognition among neighbors begins to affect the social norm (Boyce and Geller 2000). Although it is helpful for a few people to receive awards, the effect is increased when the local media announce the winners. Media-savvy organizers can multiply the benefits by first announcing the contest, rules, and categories in a major media campaign. The message is again in the news when the media cover the judging and award ceremony. Feature stories can be written on prize winners. This technique is often used to mobilize social change because it helps raise awareness and generate action in a relatively short time. It is important for the prize to be perceived as desirable, if it is going to motivate participation. The concept is widely used: costumes out of recycled materials win prizes at Halloween contests, youth send in nature artwork where the prize is publication in a local nature center calendar, and architects enter energy-efficient home designs in a solar energy center contest. It isn't hard to imagine what might be prizeworthy in the context of fire: best firewise landscape, best firewise forest, most attractive roadside, greatest change in landscape, and so on. Another possibility is to piggyback onto an existing contest, for example, by asking the local garden club to add firewise criteria to its regulations (Day and Monroe 2000, Lee and Tribe 1987, NWCG 1999).

Demonstration areas

Demonstration areas have long been used in the Cooperative Extension Service in agriculture to help meet a variety of goals. These areas provide a concrete vision of what the new behavior will look like, offer information about the consequences of the planned action, provide a local "innovator" to interact with the neighbors, and offer immediate feedback without the risk of trying it yourself (Hobbs *et al.* 1993, Rogers 1995). It is important that demonstration areas actually demonstrate the proper behavior, that they are well situated for public viewing, that the owners are amenable to visitors or tours, and

that they are successful. Demonstration areas also need to be achievable. If viewers perceive that they do not have the resources to attain this level of landscape modification, barriers to the behavior would be reinforced instead of removed. A successful demonstration of prescribed burning at a golf course in Gainesville, Florida, used an interpretive sign, a poster, and a brochure to educate nearby residents. Knowledge scores improved for respondents who saw any one of the educational materials, with the highest increase for those who saw all three items (Monroe *et al.* 1999).

A Firewise Demonstration home in Alachua County, Florida, is being used to raise awareness in the neighborhood, to make a video for homeowners, and to develop a newspaper feature story while the landscape and structural modifications are going on. Although the site will not be visited by the public, the media tools will make this home accessible (Firewise-Communities/USA 2003a). The idea of a "demonstration" was used near Orlando, Florida, for a firewise landscaping event in the parking lot of the local building supply store. A demonstration cabin was erected and landscaped with potted plants from the store. One side showed a poor practice, while the other side demonstrated firewise principles and plants (Firewise-Communities/USA 2003b).

Community events are good ways to raise awareness and generate enthusiasm.

Photo credit: City of Ruidoso

Festivals and events

Community special events can be good ways to raise awareness and generate enthusiasm. If organized by, for, and in a neighborhood, they can help build collective energy for action. Tahitian Village's Mulch Fest (near Bastrop, Texas) was organized to enable homeowners to deposit their yard waste and pick up free mulch. Vendors displayed home foams and fire retardants. Neighbors visited with each other (Macie and Hermansen 2002). The success of the program outstripped the organizers' ability to provide chippers. A permanent mulch site was discussed, but has not yet been approved (Weiss, personal communication). Cleanup days have been successfully implemented in Bend, Oregon. The organizers believe that these events succeded because community members organized the events for themselves (Jakes and Sturtevant 2002). Events help to reinforce behaviors of those who already took steps to modify their landscape and encourage others to think about doing so by creating realistic, easy-to-emulate models.

"Laws" of Effective Public Hazards Education

Much research has been done, in numerous disciplines, and on many different kinds of hazards, about communicating hazards information to the public. This extensive research record documents dozens of factors that influence the effectiveness of public hazards communication. During the mid-to-late 1980s and early 1990s research was performed that distinguished which of the many factors in the natural hazards research record were of major versus lesser importance. The findings were then tested in a large field experiment on the public in a major U.S. population center, and the findings were confirmed. Some of the conclusions have been elevated to "immutable laws" of effective public education about hazards. These principles should be included in any state-of-the-art public education campaign (Mileti *et al.* 1992).

Be Clear
Complicated phenomena must be clearly explained in nontechnical terms. Experts generally can't accomplish this, so hire people that have communication skills to work with experts to craft the words you'll give to the public.

Use Varied Sources
Information must come from various relevant sources including authorities, technical experts, and scientists and engineers (if applicable), and from people familiar to locals. Ideally, information is developed and disseminated in tandem by multiple sources.

Put out Consistent Information and Repeat it
The information people receive should be consistent, and changes from the past should be explained. The information should be repeated frequently through many different media and disseminated through varied networks such as neighborhood networks, community associations, or the media.

Use a Stream of Communications
Messages on TV and radio are effective, but what works best is an information stream of many communications through diverse media and over time. The stream should include a written document, midcampaign, direct mailed to people's homes.

Tell People What to Do
Despite what physical scientists and technical experts think, the most important information you can give people is to tell them what they can do before, during, and after an event.

Position Additional Information in the Community
People tend to search out more information on their own to validate and "confirm" what they've already gotten. So put that kind of additional information where people will look for it and tell them where they can find it.

Support People in Their Search for More Information
The first thing you can count on people doing—if the educational effort is working—is to talk it over with others and to seek out more information. Expect it. Encourage it. Support it.

Use Words and Great Graphics
Clear information works best, so use simple language supported by attractive graphics.

Lessons Learned and Examples

This synthesis offers some specific direction to managers who want to encourage residents of fire environments to reduce fuels on their property and improve preparedness for wildland fire.

- Wildfire educational programs have been effective at generating awareness, increasing knowledge, developing supportive attitudes, and in some cases, inspiring people to take action to reduce their risk of wildland fire (Beringer 2000, Boura 1998, Boyce and Geller 2000, Broussard *et al.* 2001, Carpenter *et al.* 1986, Loomis *et al.* 2001, Marynowski and Jacobson 1999, McCaffrey 2002, USFA 2002).

- To guide the development of effective tools, wildfire educational programs can use insights gained from communication and social marketing theory and research on hazard communication efforts (Beringer 2000; Clute and Mullins 2000; Cortner *et al.* 2003; Hodgson and Anderson 2001; Jacobson 1999; NWCG 1999b; Patterson *et al.* 2003; Petty and Cacioppo 1981; Rogers 1995; Rohrmann 1999a, b).

- Changing behavior is not a matter of simply creating an informational message; rather, it is a process where barriers, preferences, and the desire for involvement must all be considered. Conflicting values, unique ecosystems, historic fire behavior, individual differences, and a desire to make choices must be addressed in the message. This often means that at least a portion of the program development process must happen locally (Lee *et al.* 1987, Magill 1992-93, Monroe *et al.* 2003, O'Conner 1998, Severson and Matheny 1987, Sorvig 2001, Worley 2002).

- Understand your audience.
  - Assume that your public is diverse and tailor information to the needs of each group (Perry and Nelson 1991, Vaughan 1995, Wolfe 1993).
  - Find out if they have misconceptions that might interfere with their understanding of your message.
  - Don't assume that you understand your audience because you work in the area.

- Adapt information to your constituents and local concerns. For example, visual examples should fit with the local environmental context; if there is a disaster in local memory, reference it in your materials.

- Provide motivations to spur action. The information should be personally relevant and useful to your audience. Messages should include basic how-to procedural information but also explain why the action is necessary and how it will make a difference. Publications need to make important information stand out using a mix of both verbal and visual information.

- Consider three information needs when developing a campaign to change fuels management behavior. Although none of these can be guaranteed to change behavior, it is easy to see that the lack of any one could be a barrier to change.
  - Basic information: how to manage fuels, why it is important to do so, and the consequences of managing fuels.
  - Addressing attitudes and values: how managing fuels will enhance values and land management objectives, how activities will be accepted by the neighbors, and who else is managing fuels.
  - Skills and abilities: what it takes to manage fuels and how to find needed resources, tools, and assistance.

- Identify which communication channels are best for reaching your audience (e.g., radio, Internet, poster). Consistent information from multiple groups works better than if only one organization disseminates the information.

- Use a combination of communication tools and social marketing techniques to reach a variety of residents, because people have different learning styles and constraints. In Hood River, Oregon, in 1983, a campaign to increase energy efficiency included local groups disseminating information, various media and advertising strategies, feedback, incentives and free technical assistance. The results were a 15 percent decrease in energy consumption, large for a social marketing campaign (Lutzenhiser 2002).

- Use partnerships: High-profile organizations in the area with an established track record are important to include in the partnership. Involving residents in designing and implementing programs, particularly in deciding how to create a firewise community, helps build positive relationships between fire suppression agencies and communities, empowers residents by establishing ownership in the process, and reshapes a community norm toward greater preparedness.

- Identify whether your agency has a good enough reputation to be a trusted source of information (Jacobson 1999). People are most likely to pay attention to information if it comes from a group or a person they trust. Depending on age, education, class, and ethnicity, different people trust different sources.

- Use a variety of tools. Some are more likely to convey information about the social acceptability of fuels treatment than others (e.g., news coverage and brochure). While mass media coverage is good at raising awareness among a large group of residents, interactive personal communication techniques,

can be extremely powerful for changing attitudes and behavior (Boura 1998; Burns *et al.* 2003; Carpenter *et al.* 1986; Cortner *et al.* 1990; Creighton *et al.* 2002; Hodgson 1995; Hodgson and Anderson 2001; Laughlin and Page 1987; Lee and Tribe 1987; Loomis *et al.* 2001; McCaffrey 2004; NWCG 1998, 1999b; Patterson *et al.* 2003; Rohrmann 1999b).

The following summary of successes provides some ideas that may work elsewhere.

- In Wedgefield Estates, a subdivision near Orlando, Florida, an existing homeowners association provided the initial organizational framework for a Firewise Committee. Their newsletter provides information about Firewise landscaping in nearly every issue. Their annual events, like the golf tournament and community yard sale, always include a Firewise booth or information table. Piggy-backing a Firewise message onto an existing set of activities has enabled this group to get the word out, repeatedly, in a nonconfrontational manner (Firewise-Communities/USA 2003a, c).

- Colorado Springs, Colorado, used National Fire Plan funding to conduct a hazard assessment on every parcel in the city's wildland-urban interface. This information was coded, plotted, mapped, and put on the Internet. Through the Colorado Springs Web site, (http://csfd.springsgov.com) homeowners can get immediate information about their lots. A list of what to do to reduce risk is also on the Web, along with a number to call if residents want their lots re-evaluated. Organizers report that the program is encouraging homeowners to take a more active role in their safety (USFA 2002).

In Colorado Springs, home hazard assessments were prepared for every parcel of land in the wildland-urban interface, aided by a map of fire risk for the community.

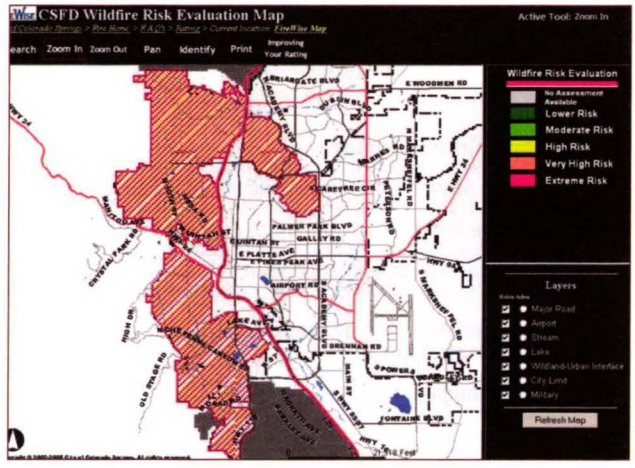

Photo credit: City of Colorado Springs

- Victoria, Australia, has seen extreme firestorms in recent years. A novel program, Community Fireguard, has been established to increase residents' ability to face such disasters. The program works with small neighborhood groups and allows the groups to choose the strategies they believe will help them survive a wildfire. These groups provide sources of motivation and energy for designing evacuation plans, lobbying authorities for new water tanks, and helping neighbors reduce fuels through work bees. The social benefits that accrue to participants make it more likely that people will participate for a long time and that a culture of safety will develop. Not heralded as an "education" program, the Country Fire Authority calls this "a framework for emergency services to interact with high risk communities" (Boura 1998).

Tips for Crafting the Ideal Message

Below are suggestions for creating the ideal message for successful public education about hazards that use the knowledge just presented. The items covered are not in descending order of importance; each is important, although some have greater importance than others (Mileti and Sorensen 1990).

Use Simple Language

Translate and manipulate information about the hazard to make it accessible. Simple language in manageable amounts is absolutely necessary. Technically sophisticated and generally incomprehensible statements of scientists, engineers, or actuaries will not give most people an understanding of the hazard and likely impacts on their lives. Although credentialed spokespersons are one of the most important sources of information, specialists who speak only in the jargon of their discipline will not be effective. Authoritative interpreters of technical information should be cultivated, encouraged, and paid well. Fit the specialist to the topic: for example, scientists should talk about science, engineers and architects should talk about structures, and firefighters and emergency responders should talk about home safety.

Keep the Information Consistent

Because most people are exposed to information through a variety of media and sources, repeat your information frequently over diverse communication modes and keep it consistent. Inconsistent information confuses people and allows them to discount some or all of it. Educators should work together, across jurisdictions and organizations, to see that their messages are similar. For example, numerous organizations—state agencies, the Red Cross, school authorities, and media outlets—should work together to come up with a common public message.

Cover Three Critical Topics

The message presented to the public should clearly explain three critical issues: (1) the potential losses, (2) the chances the losses will take place in a certain amount of time, and (3) the ways to cut the losses. These three issues can be thought of as the tripod on which good hazards public education rests. Without any one of the three legs, an initiative could teeter and ultimately fall.

Describe Potential Losses

Help people imagine the impact a hazard could have on their community, their house, or their place of work, through descriptions of the hazard, pictures, scenarios, or computer-based maps. Work to overcome the almost universal human tendency to conclude that it can't happen here or it won't happen to me. The more relevant the description is to the situation of the audience, the more likely they will attend to it. A good educator can find "the local angle" in any hazard or disaster—even in a far-off land—and work it.

Discuss the Odds About When the Losses Will Take Place

Although almost no one but mathematicians and professional gamblers really understands odds, most people will want to know in an uncomplicated sort of way the likelihood of a hazard occurring in their neighborhood. These estimates need to be for a relevant timeframe, such as the average length of ownership. A probability estimate for 50 years allows homeowners to think it likely will happen after they have left the area. Probability estimates will not, in themselves, change behavior, but the information will help create the uncertainty that is so important to changing people's opinions about a hazard and their behavior.

Embrace Uncertainty

Be clear about the lack of certainty, if any, in predicting the incidence and effects of a hazard. Any scenario of a future event is a best guess. Overstating or understating the risk or inflating or deflating the probability of a future hazardous event inoculates people against belief just as surely as inconsistency. Predictions of catastrophe strike some people as too extreme to be credible; they terrify others. Neither group will be likely to accept the information as deserving of further questioning or attention. More than one public education project has painted too dire or safe a picture and compromised its credibility.

Explain How to Cut Losses

Give people suggestions and directions for how to reduce possible losses. Without these blueprints, people can fall prey to a fatalistic inertia. Appropriate assistance may take many forms: a how-to video for homeowners, evacuation guidelines for a school, a business resumption planning process for a corporation or a city government, encouragement and help from a neighborhood emergency response team, or recommended policy changes for a water system. People can be guided to change their opinions and their actions to deal with future risk in endless ways.

Say Who's at Risk

For both education and planning purposes, specify who could and could not be at risk in a future event. For example, if we were talking about earthquakes, explaining the relative weaknesses of various building types—unbolted wood frame, un-reinforced masonry, non-ductile concrete, multi-unit apartments with tuck-under parking—would help people understand they might be injured if they live or work in such buildings. Such information also would help emergency planners anticipate response needs. Beyond physical effects, people should be helped to recognize they could be economically damaged, socially isolated, psychologically troubled, and just plain inconvenienced. Detail the exact impacts of the disaster on all groups in the community, on utilities, on transportation systems, on governmental and nonprofit organizations responsible for public health and well-being, and on affected homeowners who may spend many months displaced from their home and negotiating with insurance companies and contractors.

- Located in central Oregon's high desert, the city of Bend created the FireFree program to encourage wildfire risk reduction on both private and public land. The core belief of FireFree is that individuals can make a difference by reducing their risks from wildfire. FireFree delivers the message through the media, a public speakers bureau, educational materials provided by businesses or distributed to homes, annual cleanup days, and fundraising assistance to neighborhoods for fire safety projects (Jakes and Sturtevant 2002, ODOF 2003, Porter 2001).

FireFree is a partnership of various businesses and agencies that support homeowners in activities to reduce their wildland fire risk.

- The city of Palm Coast, Florida, experienced devastating wildfires twice in recent history. An assessment revealed that an important variable causing some houses to burn when others did not was nearby vegetation, primarily understory brush, within 30 feet. With the passage of county and city ordinances, the city now has authority to identify hazard lots (usually unbuilt with absentee owners) and notify the owners with a request to reduce vegetation. Most owners ask the city to complete the work for a reasonable fee. If the owner fails to reduce the vegetation, the city is authorized to do the work and fine the owner. Compliance has been quite high. The city, county, and state agencies have conducted complementary programs and used the publicity about the ordinance to increase homeowner awareness (Jakes *et al.* 2003, Kuypers 1995).

Photo credit: City of Bend

- On Minnesota's Gunflint Trail, between Lake Superior and the Boundary Waters Canoe Area, residents use previously existing networks and diverse skills to increase the effectiveness of the volunteer fire department, the fleet of fire suppression equipment, homeowner awareness, and homeowner action. Residents installed sprinkler systems, established a 911 emergency system, and reduced vegetation (Jakes and Nelson 2002). Community picnics and canoe races gather neighbors together and provide opportunities for agencies to spread information about fire safety.

- Communities in Lincoln National Forest in southern New Mexico faced a long summer of extreme fire conditions in 1996. Teams of agency personnel dedicated to communication and preparedness supplemented the emergency and fire suppression efforts. The FAST team (Functional Area Support Team) informed and organized those at risk, working with municipal and volunteer firefighters. The Continuing Education in Ecosystem Management team (CEEM) worked in adjacent communities on interface issues. The new faces and voices helped inspire local citizens to solve problems (Glenn 1999).

- Tahitian Village, in Bastrop County, Texas, demonstrated on quarter-acre lots how to reduce undergrowth, maintain a canopy cover, and reduce the risk of fire. For one homeowner, the fire chief's explanation that not all the vegetation on her property needed to be removed was critical to her acceptance. Although the removal of the privacy-screening understory was initially difficult for the homeowner, the knowledge that this effort might save her home was helpful. In time, she established gardens and a privacy screen closer to the road (Weiss 2002).

Members of the Student Conservation Association have worked with communities across the country, helping homeowners improve their property so that it can survive a wildfire.

- Media campaigns are always more effective when used in conjunction with other interventions. For example, Student Conservation Association (SCA) interns spent the summer of 2001 educating residents in Idaho and Nevada about how to make their property more survivable against wildfire. The interns distributed brochures, appeared on television and radio stations throughout the region, printed articles in local newspapers, and aired public service announcements on local television. Media contacts received informational media kits. The team also used portions of the Firewise program to educate the public. The SCA members canvassed 5,320 homes and hosted 49 public events. Wildland-urban interface evaluations were offered to homeowners through a toll-free telephone number. SCA interns also selected houses to be used as demonstration sites. The interns were estimated to have educated more than 26,000 people and evaluated 942 homes throughout the summer of 2001 (Mileti and Peek 2002).

Photo credit: M Monroe

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A series of syntheses were commissioned by the USDA Forest Service to aid in fuels mitigation project planning. This synthesis focuses on how managers can most effectively communicate with the public about fuels management efforts. It summarizes what is known about the techniques of persuasive communication programs and provides an outline of the characteristics of such programs. Information is drawn from the fields of environmental communication and social marketing, as well as the natural hazards and risk communication literature.

KEY WORDS: Education, communication, wildfire, wildland fire, fuels reduction, wildfire management.

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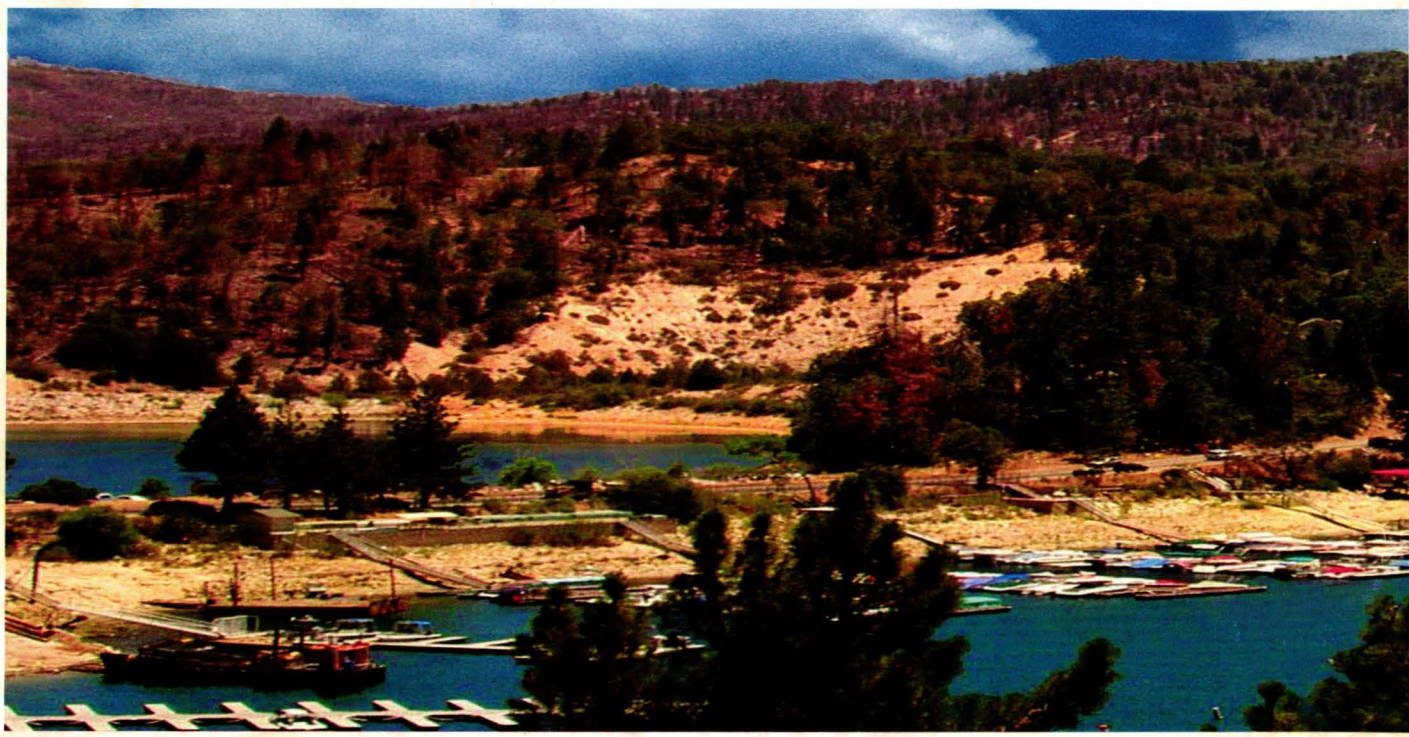

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